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A new species of *Methocha* Latreille (Hymenoptera, Tiphiidae, Methochinae) from China, with a key to the Chinese species

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Abstract

A new species, namely *Methocha transcarinata* **sp. nov.** is described and illustrated from Guangdong and Hainan, China. Additionally, *M. cariniventris* Narita & Mita, 2018 and *M. kandyensis* Krombein, 1982 are newly recorded from China. A key to all the known species of the genus from China is updated.

Keywords

China, Methochinae, *Methocha*, new record, new species

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Introduction

The subfamily Methochinae is a relatively small taxon of parasitic aculeate wasps containing two genera *Methocha* Latreille 1804 and *Karlissa* Krombein 1979. The genus *Methocha* includes 89 species and three subspecies worldwide except for the Australian Region (Lin 1966; Krombein 1982; Terayama and Mita 2015; Narita and Mita 2018, 2021; Terayama 2019; Hanima et al. 2021; Agnoli 2022), among which 45 species are distributed in the Oriental Region, ten species and two subspecies in the Palearctic Region, 25 species and one subspecies in the Ethiopian Region, five species in the Nearctic Region, and four in the Neotropical Region. Members of the genus *Methocha* show distinct sexual dimorphism with wingless ant-like females and winged males. Although the biological habit of most species is still unknown, larvae of *Methocha* are considered to be specialized ectoparasitoids of tiger beetle (Carabidae: Cicindelinae) larvae (Narita and Mita 2018). In China, so far there is no systematic study on the genus except that a total of 13 species were sporadically recorded by Smith (1869), Strand (1913), Williams (1919), Lin (1966), Tsuneki (1986) and Narita and Mita (2021). In the present paper, a new species is described and illustrated in detail, and two species are newly recorded with main morphological characters and figures. Based on related references and our collections, an updated key to all Chinese species of *Methocha* is also presented. .

Materials and methods

Specimens examined in this study are deposited in Chongqing Normal University, Chongqing, China (CNU), Yunnan Agricultural University, Kunming, China (YNAU), and Institute of Plant Protection, Guangdong Academy of Agricultural Sciences, Guangzhou, China (IPP-GAAS). They were collected mainly by active hand netting and Malaise traps which were set in various habitats and emptied once a month on average. The descriptions of specimens were made under an Olympus SZ2-ILST stereomicroscope. All photographs were taken and measured with a KEYENCE-VHX-5000 stereomicroscope, and plates were arranged with Photoshop CS 6. Body length was measured from the anterior margin of the head to the posterior margin of the terminal metasomal segment. For the density description of punctures, "sparse" means that interspaces are larger than one punctures diameter, "moderate" means equal to one diameter, and "dense" means less than one diameter. Morphological terminology follows Lin (1966) and Narita and Mita (2021). The following abbreviations are used in this paper: AOL = distance between anterior and posterior ocellus; DAO = diameter of anterior ocellus; POL = distance between posterior ocelli; S = metasomal sternum; T = metasomal tergum; A = Antennal segment.

Taxonomy

Genus *Methocha* Latreille, 1804

Methocha Latreille, 1804, Nouv. Dict. Hist. Nat. 24: 179. Type species: *Mutilla articulata* Latreille, 1792, by original·designation and monotypy.
Methoca (!)·Latreille, 1804, Hist. Nat. Crust. Ins. 13: 268.
Tengyra Latreille, 1809, Gen. Crust. Ins. 4: 115. Synonym of *Methocha* by Dalla Torre, 1897: 1. Type species: *Tengyra sanvitali* Latreille, 1809, by monotypy.
Spinolia A. Costa, 1858, Fauna Napoli Scol.: 21. Synonym of *Methocha* by Dalla Torre, 1897: 1. Type species: *Spinolia italica* Costa, 1858, by monotypy.
Dryinopsis Brues, 1910, Jour. New York Ent. Soc. 18: 16. Synonym of *Methocha* by Lin, 1966: 182. Type species: *Dryinopsis simplicipes* Brues, 1910, by monotypy.

Diagnosis. Males winged and females wingless; antennal lobe developed (Fig. 3) in both sexes; eye setose (Figs 2, 10, 18) in both sexes; in female mid and hind tibia each with 1 spur, and hind tibial spur with a row of comb-like spines; in male mid and hind tibia each with 2 spurs, and one of the two spurs with a row of comb-like spines; fore-wing with 2 submarginal cells enclosed by tubular veins (Figs 1, 9, 17).

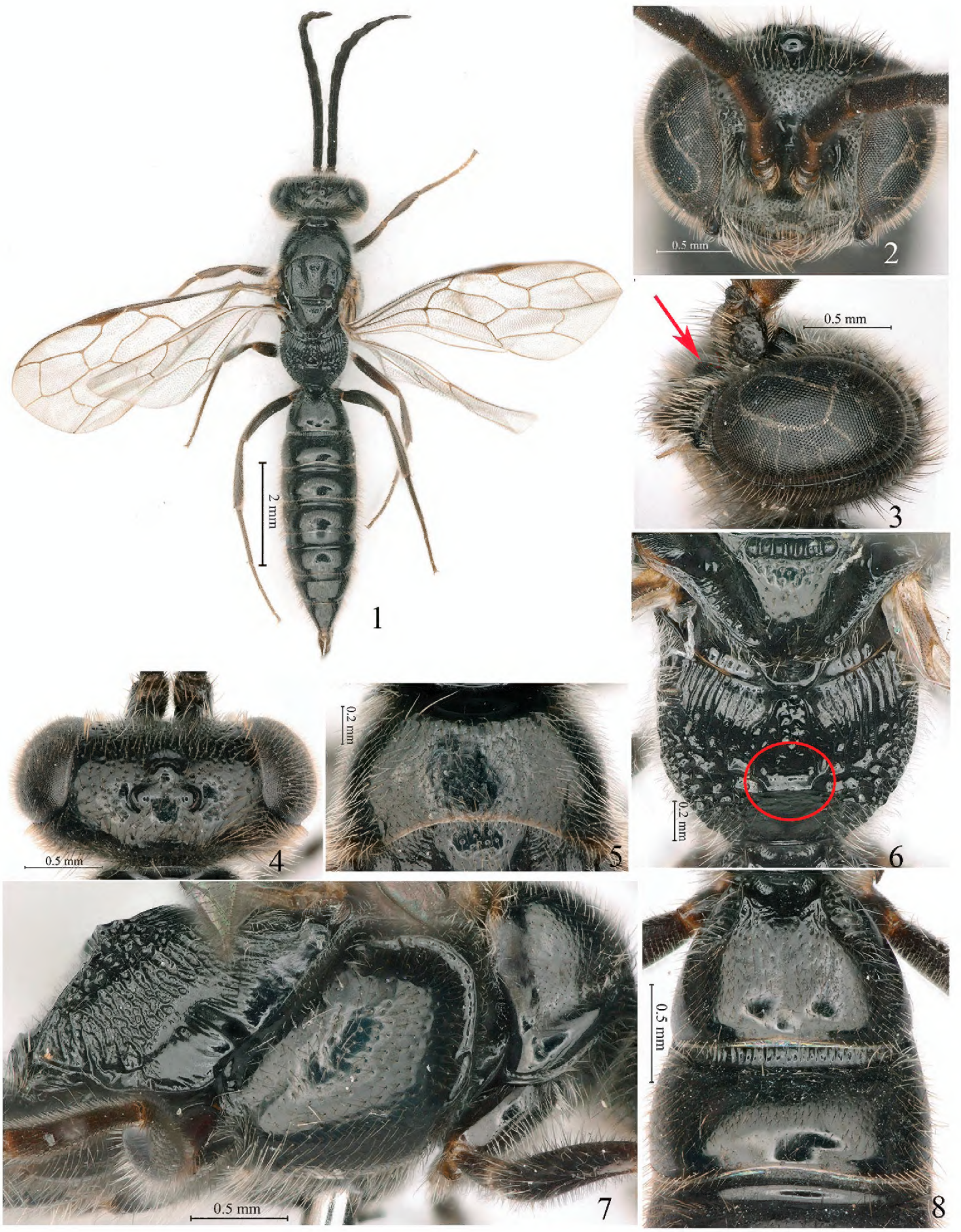
***Methocha transcarinata* Liao, Chen & Li, sp. nov.**
https://zoobank.org/CF1211FB-ACE9-404E-BAF1-ADB363A4235E
Figs 1–8

Material examined. ***Holotype***, ♂, China, Guangdong Province, Guangzhou City, Zengcheng Distinct, Xiaolou Town (Malaise trap), 23°55'20"N, 113°13'26"E, 114 m, 14.VI–1.VII.2019, Yi Guo (IPP-GAAS). Paratypes: 7♂, same as holotype; 1♂, China, Hainan Province, Changjiang County, Shilu Town, Baomeiling Nature Reserve (Malaise trap), 19°43'11.9"N, 109°37'48"E, 738 m, 3.VI–5.VII.2021, He-Shen Wang (CNU).

Diagnosis. This species can easily be separated from all other members of the genus by the following characters: dorsal surface of propodeum (Fig. 6) posteriorly with transverse carina between dorsal and posterior surfaces; mesepisternum anteriorly with strong carina followed by deep, smooth groove (Fig. 7).

Description. Male. (Figs 1–8). Body length 9.2–9.6 mm, fore-wing length 5.3–6.4 mm. Body (Fig. 1) almost black; antenna, mandible (Fig. 2), postero-lateral margin of pronotum, tegula, and leg dark brown to black. Wings untinted, veins and stigma brown.

Head. Head 0.71–0.75 times as high as wide in frontal view; clypeus distally circularly emarginated, and entirely sclerotized, without membranous area, surface with



Figures 1–8. *Methocha transcarinata* sp. nov., holotype, ♂. **1** habitus (dorsal view) **2** head (frontal view) **3** head (lateral view) **4** head (dorsal view) **5** pronotum (dorsal view) **6** propodeum (dorsal view) **7** mesosoma (lateral view, anterior to right) **8** T1 and T2 (dorsal view).

sparse and minute punctures, medially with obtuse prominence (Fig. 3); mandible distally not narrowed; ventral surface of A1 with longitudinal carina; frons with moderate to dense punctures; POL: AOL: DAO = 1: 1: 0.69 (Fig. 4), vertex (Fig. 4) and gena with sparse and minute punctures.

Mesosoma. Pronotal transverse carina absent (Fig. 5), dorsal surface of pronotum sparsely minutely punctate; anterior half of pronotum latero-ventrally with sparse minute punctures (Fig. 7), antero-ventrally carinate, with groove behind carina containing short striae, posterior half smooth and impunctate; mesonotum medially with sparse punctures and laterally with dense punctures; mesepisternum (Fig. 7) anteriorly with strong carina followed by deep, smooth groove, elsewhere with sparse and minute punctures; scutellum sparsely punctate; metanotum medially with U-shaped depression, elsewhere sparsely striate, and with smooth interspaces; dorsal surface of propodeum (Fig. 6) with broad median groove and granulate interspace, posteriorly with strong transverse carina between dorsal and posterior surfaces, antero-laterally with longitudinal striae, postero-laterally with irregular areolate sculpture; posterior surface of propodeum medially smooth, laterally with coarse and large punctures; lateral surface (Fig. 7) of propodeum antero-ventrally with oblique striae, postero-ventrally smooth, dorsally with coarse punctures. Claws of hind tarsaus with subapical tooth shorter than half of apical tooth.

Metasoma. Metasomal terga sparsely punctate and with smooth interspaces. T1 (Fig. 8) antero-laterally with pair of strong longitudinal carinae, and with shallow median groove between longitudinal carinae. T1 transversely depressed posteriorly, T2–T6 and S2–S6 transversely depressed both anteriorly and posteriorly, anterior depressions of both T2 and S2–S6 costate, anterior ones of T3–T6 and posterior ones of both T1–T6 and S2–S6 smooth. S1 with sparse punctures; S2–S6 anteriorly with dense punctures, posteriorly with sparse ones, medially without longitudinal depression; S7 sparsely punctate and with smooth interspaces.

Female. Unknown.

Distribution. China (Guangdong, Hainan).

Etymology. The specific name *transcarinata* is derived from the two Latin words: *trans-* (= transverse) + *carinata* (= carinate), referring to the propodeum with a transverse carina between dorsal and posterior surfaces.

Methocha cariniventris Narita & Mita, 2018, new record

Figs 9–16

Methocha cariniventris Narita & Mita, 2018: 61–64.

Material examined. 4♂, China, Yunnan, Jinghong City, Menghai County, Bulang Mountain (Malaise trap), 21°37'43.87"N, 100°24'18.97"E, 1420 m, 25.IV–9.VIII.2018, Qiang Li (YNAU); 1♂, China, Yunnan, Hani-Yi Autonomous Prefecture of Honghe, Lvchun County, Water-shed, 22°59'18.5"N, 102°27'14.7"E, 1900–1980 m, 25.VII.2003, Jia Lu (YNAU).

Figures 9–16. *Methocha cariniventris*, ♂. **9** habitus (dorsal view) **10** head (frontal view) **11** head (lateral view) **12** head (dorsal view) **13** pronotum (dorsal view) **14** propodeum (dorsal view) **15** mesosoma (lateral view, anterior to the right) **16** T1 and T2 (dorsal view).

Diagnosis. Male (Fig. 9). Head 0.7 times as high as wide in frontal view (Fig. 10); clypeus (Fig. 10) distally with triangular membranous area, medially with carinate prominence (Figs 10, 11); mandible distally not narrowed (Fig. 10); ventral surface of A1 with longitudinal carina (Fig. 11); POL: AOL: DAO = 1.0: 1.0: 0.6 (Fig. 12); pronotum dorsally with sparse and minute punctures (Fig. 13), laterally strongly striate (Fig. 15); anterior margin of mesepisternum (Fig. 15) with strong carina followed by deep, costate groove, carina dorsally weak, surface reticulate; propodeum (Fig. 14) anteriorly with longitudinal striae, medially irregularly reticulate without groove, and posteriorly with transverse striae; lateral surface of propodeum antero-ventrally with oblique striae, dorsally with dense punctures; T1 (Fig. 16) anteriorly with pair of longitudinal carinae and median groove; anterior transverse depression of T2 (Fig. 16) costate; anterior transverse depression of T3 weakly costate; anterior transverse depression of T4–T6 smooth; S2–S6 medially without longitudinal depression.

Female. Unknown.

Distribution. China (new record: Yunnan); Laos.

Methocha kandyensis Krombein, 1982, new record

Figs 17–24

Methocha (*Dryinopsis*) *kandyensis* Krombein, 1982: 97–98.

Material examined. 1♂, China, Fujian Province, Nanping City, Wuyi Mountain Nature Reserve (Malaise trap), 27°44'32.52"N, 117°40'56.23"E, 707 m, 08.VII.2021, Jin-Lan Li (CNU).

Diagnosis. Male (Fig. 17). Head 0.76 times as high as wide in frontal view (Fig. 18); clypeus (Fig. 18) distally with triangular membranous area, medially with carinate projection (Figs 18, 19); mandible distally not narrowed (Fig. 18); ventral surface of A1 with longitudinal carina (Fig. 19); POL: AOL: DAO = 1.0: 1.0: 0.83 (Fig. 20); pronotum anteriorly with short transverse striae, posteriorly with very sparse and minute punctures (Fig. 21), laterally medially strongly striate, latero-ventrally striate (Fig. 23); anterior margin of mesepisternum with strong carina

followed by deep, costate groove, carina dorsally weak; propodeum anteriorly with longitudinal striae, posteriorly irregularly reticulate, laterally postero-ventrally with oblique striae, dorsally with dense punctures; T1 (Fig. 24) anteriorly with pair of longitudinal carinae, and with median groove and longitudinal striae between longitudinal carinae; anterior transverse depression of T2 (Fig. 24) costate; anterior transverse depression of T3–T6 smooth; S2–S6 medially without longitudinal depression.

Female. Unknown.

Distribution. China (new record: Fujian); Sri Lanka.

Figures 17–24. *Methocha kandyensis*, ♂. **17** habitus (dorsal view) **18** head (frontal view) **19** head (lateral view) **20** head (dorsal view) **21** pronotum (dorsal view) **22** propodeum (dorsal view) **23** mesosoma (lateral view, anterior to the right) **24** T1 and T2 (dorsal view).

Key to the species of *Methocha* from China (modified from the key of Narita & Mita, 2021)

1 Winged (male) **2**
– Wingless (female) **13**
2 Mesepisternum dorsally or ventrally with row of elongate foveae **3**
– Mesepisternum wholly without elongate foveae (Fig. 7) **4**
3 Clypeus distally deeply emarginate; mesepisternum dorsally foveolate ..... ***M. taiwanica* Tsuneki, 1986**
– Clypeus distally slightly emarginate; mesepisternum ventrally foveolate ..... ***M. articulata* (Latreille, 1792)**
4 Clypeus apically with triangular membranous area **5**
– Clypeus entirely sclerotized, apically without membranous area **8**
5 Claws of hind tarsus with subapical tooth shorter than half of apical tooth ... **6**
– Claws of hind tarsus with subapical tooth almost as long as apical tooth ..... ***M. maai* Lin, 1966**
6 Propodeum areolate; S2–S6 all distinctly depressed medially ..... ***M. foveiventris* Lin, 1966**
– Propodeum longitudinally striate; S2–S6 not depressed medially **7**
7 Pronotum anteriorly with transverse and short striae, posteriorly with sparse and minute punctures (Fig. 21), laterally strongly striate (Fig. 23) ..... ***M. kandyensis* Krombein, 1982**
– Pronotum wholly with sparse minute punctures (Fig. 13), laterally weakly striate, latero-ventrally smooth (Fig. 15) .... ***M. cariniventris* Narita & Mita, 2018**
8 Mandible distally not narrowed **9**
– Mandible narrowed in distal half or third **11**
9 Dorsal surface of propodeum (Fig. 6) with transverse carina between dorsal and posterior surfaces..... ***M. transcarinata* Liao, Chen & Li, sp. nov.**
– Dorsal surface of propodeum evenly sculptured, without transverse carina between dorsal and posterior surfaces..... **10**
10 Propodeum dorsally areolate, with smooth interspaces .... ***M. areolata* Lin, 1966**
– Propodeum dorsally longitudinally striate, with granulate interspaces ..... ***M. cirrhocrus* Narita & Mita, 2021**
11 Propodeum dorsally distinctly areolate; ventral surface of A1 with longitudinal carina **12**
– Propodeum dorsally finely areolate or areolae absent; ventral surface of A1 without carina..... ***M. alutacea* Lin, 1966**
12 Clypeus medially with obtuse prominence; pronotum anteriorly with transverse short striae..... ***M. mandibularis* (Smith, 1869)**
– Clypeus medially with acute prominence; pronotum anteriorly without striae, instead with dense large punctures..... ***M. cavipyga* Lin, 1966**

13 All tarsal claws with subapical tooth equal to or longer than apical tooth..**14**
– All tarsal claws with subapical tooth shorter than apical tooth.....**15**
14 Gena narrowed ventrally, posterior margin slightly incurved in lateral view; mesosoma entirely black .....***M. maai* Lin, 1966**
– Gena wider than that of the above species, posterior margin subangularly incurved in lateral view; mesosoma dark reddish.....***M. plana* Lin, 1966**
15 Both frons and distal two-thirds of clypeus rugose***M. foveiventris* Lin, 1966**
– Both frons and distal one-thirds of clypeus not rugose, instead impunctate or punctate.....**16**
16 Frontal tubercles above antennal sockets absent **17**
– Pair of frontal tubercles above antennal sockets present.....**18**
17 Clypeal apex incurved.....***M. emarginata* Lin, 1966**
– Clypeal apex truncate.....***M. formosana* Williams, 1919**
18 Pronotum strongly convex, without median groove .....
.....***M. articulata* (Latreille, 1792)**
– Pronotum not strongly convex, and with weak median groove.....
.....***M. priorrecta* Lin, 1966**

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